California Fuel Cell Partnership

- Formative work began Fall 1998
- Announced April 20, 1999
- Partners include DaimlerChrysler, Ford, Honda, Hyundai, Nissan, Volkswagen, Ballard, IFC, BP, Shell, Texaco, CARB, CEC, SCAQMD, U.S. DOE, U.S. DOT
- Associate Partners: AC Transit, SunLine Transit, Air Products, Linde AG, Praxair, Methanex
- Originated from a mutual desire to demonstrate fuel cell technology and promote commercialization

Goals of the California Fuel Cell Partnership

The partnership has four main goals:

1) Demonstrate vehicle technology
2) Demonstrate fuel cell vehicle fueling infrastructure
3) Explore the path to commercialization
4) Increase public awareness

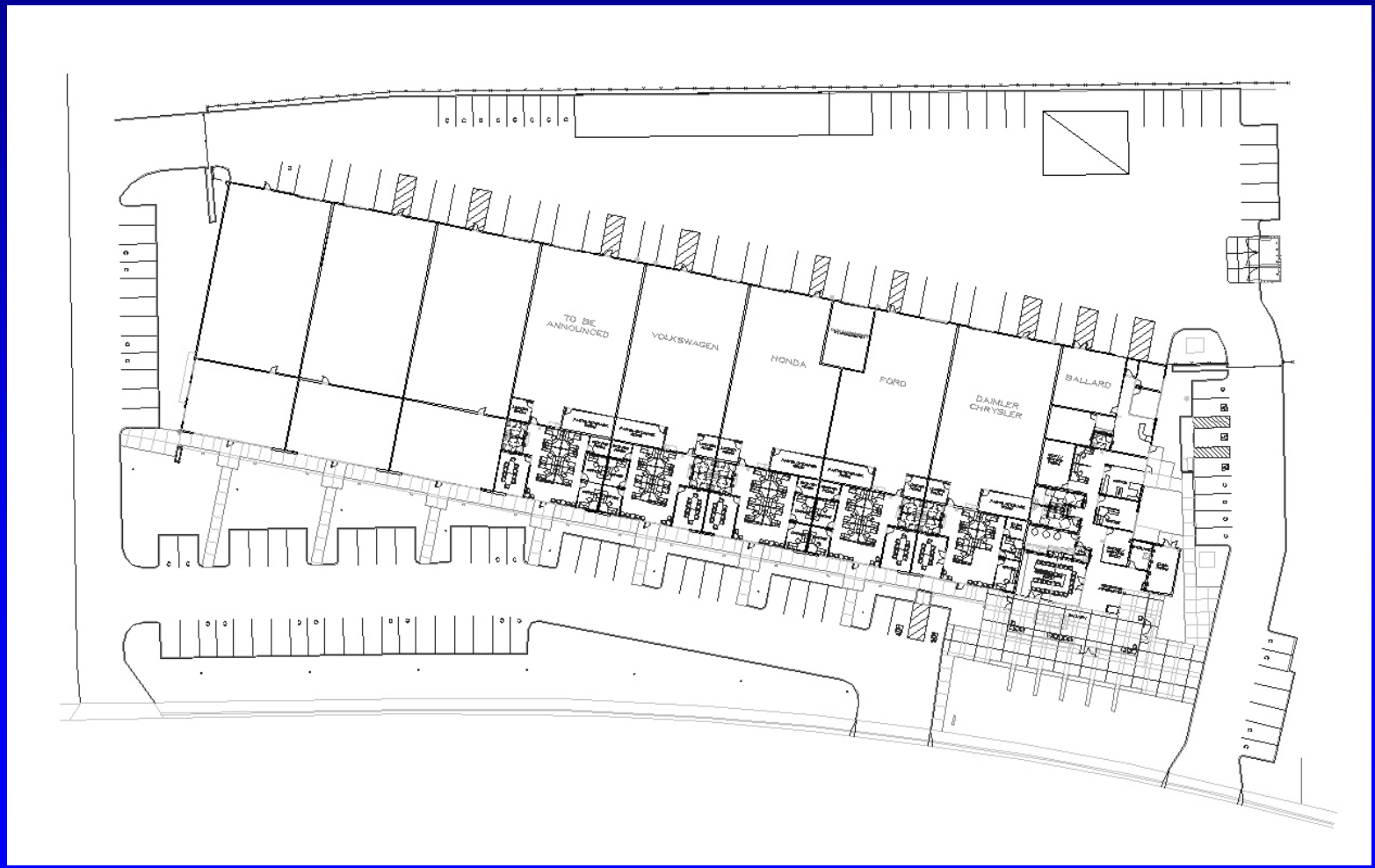
Project Phases

- Phase 1: 1999
  - Project development
- Phase 2: 2000-2001
  - Up to 18 passenger cars and 5 buses
- Phase 3: 2002-2003
  - Up to 56 passenger cars and 20 buses

West Sacramento Facility

- West Sacramento Facility
  - 4.8 acre site
  - 55,000 square-feet, state-of-the-art facility
  - Contractors to develop site : Pigman Companies, Williams & Paddon, Booz-Allen Hamilton, Earl Construction, Therma and Rex Moore

West Sacramento Facility



Fuel Infrastructure

- Construct a Central Fueling Station
  - Provide hydrogen for up to 30 demonstration vehicles for at least 2 years
  - Install hydrogen delivery system
  - Provide methanol and gasoline for cars delivered later in the program
- Investigate technologies for satellite stations

Fueling Facility

- Associate Partners and Energy Providers will design, construct and fund a H_2 station
- Modeled after similar facilities
- Hydrogen fuel station will provide gaseous hydrogen at two pressures
- Methanol fueling facilities (on-site)
- Gasoline fueling facilities (on-site or off-site)

Vehicle Planning

Phase 1: until II/2000

- Planning and initial internal development efforts

Phase 2: III/2000 - 2001

- Limited prototype field testing under control of OEMs
- Duration depends on field experience
- Fuel: Hydrogen
- Number of test units*:
  light-duty veh.: ≈ 18
  Buses: ≈ 5

Phase 3: 2002 - 2003

- Extended prototype field testing under control of OEMs
- Limited fleet customers beginning in 2003
- Fuels: - Hydrogen
  - Methanol
  - Gasoline
  - Other (?)
- Number of test units*:
  light-duty veh. ≈ 56
  Buses: ≈ 20

* numbers based on the 5 current auto partners

Fuel Cell Bus Demonstration

- Phase 1 ~ 1999 - 2000
  - planning and resource procurement
  - ZEbus, with XCELLSIS P4 engine demonstrated at SunLine Transit
- Phase 2 ~ 2001 - 2002
  - Four new P4 buses (total) will be demonstrated at two transit agencies
- Phase 3 ~ 2002 - 2003
  - Twenty P5 fuel cell bus engines (total) will be demonstrated at four transit agencies

Fuel Cell Bus

Testing Performance Abilities

- Drive 40,000 annual miles
- Meet a daily range of 325 - 375 miles
- Meet a top speed of 72 mph
- Meet local requirements for grade and acceleration
- Operate under temperatures greater than 40 degrees C
- Operating reliability
- Operate under urban heavy-duty cycles

Associate Partner Transit Agencies

Alameda Contra Costa Transit
East Bay Area

SunLine Transit Agency
Coachella Valley

Fuel Stations

- SunLine status
  - Have a well developed hydrogen fueling system now with several ICE vehicles operating
- AC Transit status
  - Will require fueling and hydrogen-related building upgrades

Exploring the Path to Commercialization

Roadmap Study

- Cooperative effort among CaFCP members
- Examine opportunities and barriers to commercializing FCEVs
- Consider several fuel options
  - »will NOT pick winners/losers
- Expected draft completion date is Spring 2001